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# USSR Report

CONSTRUCTION AND EQUIPMENT

No. 57

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## CONSTRUCTION

### GOSSTROY OFFICIAL ON PROBLEMS IN CAPITAL CONSTRUCTION

Moscow STROITEL' in Russian No 12, Dec 81 (signed to press 20 Nov 81) pp 4-7

[Article by USSR Gosstroy First Deputy Chairman A. D. Deminov: "On the Threshold of the Second Year of the Five-Year Plan"]

[Text] As a result of the labor and political upsurge caused by the resolutions of the 26th CPSU Congress and the widespread socialist competition in the first half of 1981, continued growth in the country's economic potential has been ensured and the well-being of the people has been increased.

Fixed assets with a total value of 30.9 billion rubles, 1.3 billion rubles more than during the same period last year, have been put into operation through state capital investments in the national economy as a whole.

State capital investments in the national economy were about 53 billion rubles, a four percent increase when compared with the first half of 1980.

Builders of heavy industry enterprises carried out the plan for the first half of the year in terms of putting into operation capacities to produce the main types of industrial output.

Given a January-June plan for putting 40 production projects and capacities of the USSR State Economic and Social Development Plan into operation, we put 42 into operation.

However, the state of affairs in capital construction as a whole is causing great concern. The assignment for putting fixed assets into operation through state capital investments was implemented at a 30.9 billion ruble level in the first half of the year, which is less than 80 percent of planned.

Many construction organizations underfulfilled assignments for commodity construction output and labor productivity growth.

At the November (1981) CPSU Central Committee Plenum, the Politburo set the task of not just fulfilling the 1982 plan, but overfulfilling it. In order to do this in capital construction, we need to in fact achieve radical advances, putting production capacities into operation at all projects outlined by the plan, without exception.



"One feature of the draft five-year plan and the draft 1982 plan," Comrade L. I. Brezhnev noted at the Plenum, "is that they anticipate a significant increase in the start-up of fixed assets with smaller capital investment growth. The CPSU Central Committee Politburo supports the government proposal on reducing the volume of construction-installation work and capital investment initially planned for the five-year plan by 30 billion rubles. Why?

"Consideration was given to the available material and labor resources, the capacity of construction organizations, as well as the significant amounts of unfinished construction. We essentially now have a realistic, better-balanced capital construction plan. This creates the conditions necessary for normal work."

Responding with deeds to the resolutions of the 26th CPSU Congress, the CPSU Central Committee Plenum and the session of the USSR Supreme Soviet's 10th Convocation, workers in construction, scientific research and planning institutes are trying to effect the fastest possible turnaround towards intensive methods of organizing capital construction, towards improving work quality on a base of the achievements of construction science and engineering.

Jointly with the construction ministries, the USSR Gosstroy has worked out a comprehensive target program for developing science and engineering in the field of building components, materials, machines and machinery, and production organization and technology. Ten scientific-technical programs for designing and building progressive standard houses, industrial, agricultural and public buildings and structures, new methods of urban development and shaping industrial centers and effective technical resolutions when putting up nuclear and other electric power plants, railroad lines, roads and seaports, as well as creating automated control systems in the branch have been approved.

According to preliminary calculations, implementation of the indicated programs will enable us to reduce rolled metal expenditures by approximately one million tons and cement expenditures by 1.8 million tons and to significantly reduce labor expenditures in 1985 as compared with 1980.

Construction sites will be using economical types of components: sheathing, (metal) membranes, larger thin-walled flat and three-dimensional reinforced concrete components and ones made with high-strength and lightweight concretes. Centrifuged columns, efficient spans, reinforced concrete stand pipes, wide-shelf T- and ordinary T-beams and high-strength reinforcing steel will be widely used. We intend to introduce glued wooden and asbestos-cement components in large volumes.

An enormous amount of work needs to be done to further improve construction organization and work production, to organize labor and mechanize production and, on that basis, achieve the planned increase in labor productivity. In fact, as we know, the entire increment in construction-installation work volume in 1981-1985 must be obtained only through increased labor productivity.

These data testify to large unused reserves in this area. B. Moshtalerov's masons brigade (Omsk trust No 2) achieved an average shift output per person of 3.4 m<sup>3</sup> of brick laid, including all concomitant work; V. Tsypkin's brigade (Leningrad trust No 5) -- 3.0 m<sup>3</sup>, A. Yadzyavichus' brigade (Vil'nyus, Vilniusstroy trust) -- 3.05 m<sup>3</sup>. This is a very high level of output. In fact, given approximately the same labor-intensiveness of the bricklaying, output at many construction projects does not exceed

1.2-1.5 m<sup>3</sup>. In housing installation, A. Ivanov's brigade (Pskov house-building combine) has achieved a steady average output of 9.4 m<sup>2</sup> of usable area per person per shift. At the same time, this indicator is 4-6 m<sup>2</sup> at a large number of construction sites with identical installation labor intensiveness.

Similar examples could be given for other types of work as well.

The construction ministries have analyzed the factors influencing achieving such high indicators. They defined three main categories regulated by construction norms and rules: efficiency of construction organization, work production and labor organization. It was established that the following applies in organizations in which brigades are achieving high outputs:

- technological sets of equipment and dispatcher control are successfully introduced;
- maximum construction process mechanization is achieved;
- brigades work in accordance with five-year, annual and monthly plans on the basis of weekly and daily schedules;
- the brigade contract is introduced into worker collectives;
- brigades are provided with standard sets of tools, machinery and equipment;
- the mandatory technology outlined in work production plans and flow charts is introduced;
- scientific labor organization requirements stipulated in labor process charts are met.

We cannot be silent here about the fact that leading production workers are using numerous technical improvements in performing different jobs; these include "stuffing" the next floor of housing being built with containers of the necessary bathroom and laundry fittings, ceramic tile, parquet clapboard, packets of carpentry items, floor beams and others. And all this is transported by machine, by cranes, up to the floor span level.

And the results of all these introductions have been outstanding. If all brigades employed in construction were to achieve just 60-80 percent of the output of the leading production workers, labor productivity in construction as a whole would rise by several dozen percent.

The experience of the leading workers is a systems approach to their work, one based on well-developed technology and strict observance of planning, technological and labor discipline.

However, by no means all construction project, engineering-technical and brigade leaders have armed themselves with this style of work yet. And it is time they did. This will lead to major successes in the new, second year of the five-year plan.

Intrashift and technological idle time are still high in construction. Eliminating them will provide an opportunity to greatly improve construction production effectiveness. The Kaunas House-Building Combine is seriously concerned with eliminating working time losses. Monthly time and motion studies are made here by specialty, revealing causes of intrashift and technological idle time in the brigades and determining opportunities for increasing labor efficiency. The materials obtained are analyzed, then discussed in production meetings, and steps are taken to eliminate shortcomings. As a result, working time losses in combine construction brigades

have been reduced significantly and construction worker collectives are coping successfully with the production assignments.

As is known, labor productivity improvement is facilitated by the introduction of new equipment and by construction mechanization. These are the most important levers for improving the effectiveness of construction production. Each construction organization has specific assignments for introducing new equipment and for mechanizing construction-installation work.

It often happens that conditions for introducing new equipment are the same at different construction organizations, but the results are different. Why? Some 96 percent of industrial-project construction at Vladimirskiy TUS [not further identified] construction sites is fully prefabricated, resulting in an economic effectiveness of introducing new equipment of more than two million rubles per year. In the Glavivanovskstroy last year, only 10 of the 21 new equipment introduction projects were carried out. Labor productivity has hardly grown at all over the past two years and losses from failure to carry out measures on introducing new equipment and poor work mechanization were approximately 600,000 rubles last year. The primary reason for so great a lag among Glavivanovskstroy builders is serious shortcomings in preparing production and organizing construction. There is no real struggle here for plan fulfillment in terms of introducing new equipment, and planning, technological and labor discipline are low at the main administration's construction sites.

Such shortcomings occur in many construction organizations, including in a number of places where technological set assembly and dispatcher control services are still not operating efficiently.

The USSR Gosstroy, Glavmosstroy and USSR Exhibit of National Economic Achievements recently conducted a unionwide school to study leading experience in assembling complete sets of technological equipment for construction sites: components, materials and items, as well as containerization and transporting freight to the sites. The school demonstrated that a definite system of procuring numerous types of items and industrial-type semifinished products, as well as preparing them for actual consumption, has been worked out in construction and that, moreover, experience has been accumulated in containerized shipment of items and materials to construction sites and workplaces. How effective is this system as a whole? Shifting the production processes (sorting, selection, processing and set assembly) from construction sites and mechanizing them have helped raise production standards, raise the level of industrialization and improve construction quality, lower labor-intensiveness and cost, and reduce materials expenditures. Thus, producing 10,000 meters of pipe per year with bitumen-perlite insulation at the Glavmosstroy production base enables us to lower labor expenditures on pipe laying by more than 20,000 man-days and to save 300,000 rubles. Centralized linoleum roofing unrolling and welding enables us to reduce labor expenditures nearly three-fold; centralized procurement and assembly of 10 million square meters of wallpaper into sets permits saving upwards of 100,000 rubles, with a significant reduction in labor expenditures. The effectiveness is indisputable.

Then why has technological set assembly not yet been introduced everywhere, when in fact large expenditures would not be required? There can only be one answer: certain construction organization leaders underestimate the value of prompt production preparation. However, an assiduous manager always finds a way. Construction organizations without a capital base for technological set assembly, along with shaping a

resolution to the question of creating it, must not shelve the matter, but quickly create the needed, albeit temporary, base so as to raise the technical level of technological set assembly.

In order to familiarize ourselves with leading experience in organizing technological set assembly, it is recommended that we study such systems in the Glavmosstroy, Glavleningradstroy, trust No 1 of the Glavarkhangel'skstroy, Uzbekshakhtostroy trust, and many other construction organizations which have been successful along this line.

In order to improve the effectiveness of technological set assembly, it is important that we use the Vinnitsa method of set assembly in the consolidated brigade. Given active dispatcher control, which is also extending its impact to the brigade, this method leads to high, positive production results.

Construction dispatcher control must be extended, as was already stated, to each brigade and must be based on weekly-daily planning. This is confirmed by the leading work experience of collectives of such well-known trusts as the Lipetskstroy and many others.

Mosoblstroy trust No 5 has achieved great efficiency through introduction of dispatcher control. An operational-dispatcher group (ODG) was created to do this. Here, work is done on the basis of weekly-daily planning. Approved weekly-daily schedules are transmitted the responsible implementing general contractor and subcontractor organizations for execution. ODG facilitates precise adherence to weekly-daily schedules. In 1980 alone, one trust saved a total of 256,000 rubles as a result of introducing weekly-daily planning and dispatcher control.

The role of technological documentation -- construction organization plans, work production plans and flow charts -- must be heightened in construction.

We have in construction time-tested, practically-proven rules: no worker can be permitted to perform a job without verifying his knowledge of equipment safety. Failure to follow these rules even entails harsh punishment. Why, then, are brigades in many instances allowed to perform jobs without careful study and knowledge of the work production plan, flow charts and labor-process charts? A low level of work production and quality is often permitted as a result.

Comrade L. I. Brezhnev pointed out at the 26th CPSU Congress the necessity of increasing the responsibility of implementers for carrying out approved plans. Plans must be well substantiated and provided with resources. Continuous planning, which permits construction collectives to prepare in advance for carrying out the plan for the following month, quarter and year, is being successfully introduced in construction.

The work experience of the leading construction collectives shows that introducing continuous brigade work planning for the five-year, annual, quarterly and monthly plan facilitates a significant rise in their work efficiency. The work experience of the brigade of Hero of Socialist Labor and USSR State Prize winner I. D. Ganchev is known nationwide. This collective, working under this system, has improved its work indicators year after year. In the last year of the Ninth Five-Year Plan, the brigade utilized 2.85 million rubles, given an average output of 6.76 square meters of usable area per worker per shift; last year, with the brigade size still 36 workers, 3.6 million rubles was utilized and output reached nearly 8 m<sup>2</sup>! The brigade has achieved an annual output per worker of 100,000 rubles. There are many such "hundred



thousander" brigades in Moscow, the Ukraine, Krasnoyarskiy Kray, Irkutskaya Oblast and elsewhere. We need to disseminate the continuous planning system widely in construction.

An especially effective method of labor organization, the brigade contract, first used by Hero of Socialist Labor N. A. Zlobin, has been disseminated widely in construction.

The "Basic Directions of USSR Economic and Social Development in 1981-1985 and Up To 1990" point out the necessity of creating conditions for the universal dissemination of the integral-process flow-line brigade contract on the basis of a higher level of engineering preparation and production-technological set assembly.

It is especially important that all links of the construction conveyor, "plant - transport - construction site," be transferred to the contract, that is, that it become an integral process and that work be organized on a flow-line basis following a unified schedule and job authorization. Such labor organization orients all participants in construction towards the end result of putting projects into operation as quickly as possible.

However, many ministry and department construction organizations are still insufficiently concerned with introducing the brigade contract and have not ensured fulfillment of the corresponding assignments set for 1981. We cannot fail to note that the effectiveness of contract brigade work is still poor in many instances, due to unsatisfactory set assembly and work organization and mechanization.

Poor use is being made of the brigade contract in rural production construction, where it could be most effective.

In industrial construction, the activity of cost-accounting general contractor and subcontractor organization brigades has been inadequately concentrated on resolving the primary task, that of comprehensive project construction and putting capacities into operation promptly.

The brigade contract method is used very little when renovating and retooling existing enterprises, although we know this is one of the primary directions in capital construction in the 11th Five-Year Plan.

As the work experience of N. A. Zlobin's brigade and many other construction collectives shows, consolidated brigades achieve the best results. There has been advancement along this line: in the 10th Five-Year Plan, the average brigade size increased from 10 to 19 people. Work should be continued along this line. Brigade consolidation permits focusing the attention of engineering-technical workers on organizing the integral-process flow-line brigade contract, which is more complex than ensuring the work of individual cost-accounting brigades. Doing the work with consolidated brigades facilitates concentrating material resources at the most important start-up and carry-over projects.

One important factor in the success of the brigade contract is the creation of consolidated brigades capable of working at individual projects, technological complexes and large technological centers not "by eye," but on the basis of scientific calculation of numerical-skill composition.

Of course, the specifics and conditions of the construction must be taken into account in each specific instance when deciding the question of consolidating brigades.

Analysis of the work results of 1,475 cost-accounting brigades which was done by the USSR Gosstroy's All-Union Scientific Research and Planning Institute of Labor in Construction, with the participation of ministry and department normative-research organizations in 1979-1980 showed that one in every five brigades working on contract had not achieved positive results.

It was established that the brigade itself was at fault in only six of 100 instances, the administration was at fault in 36 for failing to meet obligations in terms of material-technical provision of the brigades, brigades were allowed to be transferred to other projects in 16 instances, and in 28 instances related organizations were at fault for not doing their jobs promptly.

However, it was established that these violations could have been avoided, in a majority of instances, by observing planning, technological and labor discipline and by organizing construction production properly.

At various technical conferences and in the press, construction workers have made remarks and proposals on improving the mechanism and further developing the brigade contract.

We are currently re-examining existing provisions, guides and methods instructions on questions of introducing the brigade contract. In particular, we will review the terms for awarding bonuses to cost-accounting brigade workers in view of their actual contribution to overall results.

The brigade contract must become one of the main factors in improving capital construction, accelerating the start-up of capacities and projects, and raising the organizational and technical level of construction in the 11th Five-Year Plan.

Along with contract brigades, much attention should be paid to strengthening all remaining brigades employed in construction.

The instructions of the 26th Party Congress on further disseminating and improving the effectiveness of the brigade form of labor organization and wages apply directly to construction-installation brigades.

The steps to improve the economic mechanism anticipate that planning must now begin with the brigade and that the material incentives system must now be oriented towards it. The experience of the leading enterprises shows that reliance on the labor collective and involving it in management do much to facilitate strengthening the prestige of leaders of lower links and to produce correct production and educational measures.

Production brigade collectives (councils) are given the right, within the normatives and funds established for them, to determine the size of bonuses and wages paid for results of the entire brigade collective, with consideration of the actual contribution of each brigade member to overall work results and to offer brigade members additional wages and wage supplements for occupational skill and for combining occupations. They can recommend that the administration and trade-union organization change

the rate category of a worker in view of the quality of his work, under established procedures. The council determines the winners of socialist competition within the brigade and the amount of incentive, promotes brigade members as candidates for material and moral incentives on the basis of socialist competition results.

The brigade leader is given a large role.

In V. I. Lenin's words, the fruitfulness of the leader's activity is ensured not on the strength of his power, but on the strength of his authority, energy, experience, broader perspective and greater talent.

Apropos of this was Comrade N. A. Zlobin's comment in an article published in the No 1, 1981 issue of STROITEL': "The brigade leader has tremendous independence," he said. "It is no longer enough just to be skilled, to know how to help a worker, to teach him how most productively to perform a particular operation, in order to lead a brigade. Today, only those who possess both technical and economic skills have the right to head a consolidated brigade. The brigade leader is also an educator."

The problem is correctly and essentially stated. It is within the power of every construction-installation trust to educate such brigade leaders, since they have all the means and opportunities necessary to do so: well-equipped study combines, instructors and, of course, great opportunities to set up ideological and political-education work. And many brigade leaders should do more themselves to study leading experience. Comrade N. A. Zlobin offers an example. "I already had 20 years of work at construction projects," says the outstanding brigade leader, "when I entered the tekhnikum. It was hard, and there was too little time, but I earned a diploma and acquired the necessary skills."

The famous CPSU Central Committee decree "On Further Improving Ideological and Political-Education Work" defines the basic tasks of construction organizations along this line. The work experience of collectives of the best construction-installation trusts shows that unity of pedagogical-ideological-education and production work leads to big positive results in all areas of activity. For example, Glavnovosibirskstroy trust No 43, where the party committee, economic leadership and construction site committee, relying heavily on the party and nonparty aktiv in conducting purposeful ideological and political-education work, has achieved significant success in production work. This last five-year plan, it put all start-up projects into operation and carried out all other production assignments. Both economic and social and moral valuing of honest, conscientious labor are especially evident in this leading collective. Success is ensured by people working conscientiously, giving all they have for the good of our homeland. In this trust, as in many other leading organizations, young people are taught well and tutelage is developed as a primary method of educating young people.

"Tutors," Comrade L. I. Brezhnev has noted, "in a sense pass the labor baton from the present to the future." They teach young people a love of labor freely, at their heart's bidding, transmitting to them their rich experience and knowledge without begrudging either the effort or time. Without material reward, or in Lenin's words, "without any payment," they actively take up this most noble cause and resolve one of the most responsible and complex tasks, that of shaping tomorrow's workers as fully competent, self-reliant people. They mold, cast and polish the character of young fighters in the great army of labor.

Precisely as Leonid Il'ich recommends, it is the task of construction collective leaders to set up the work of tutors, who are the primary force in educating young construction workers. They must also make a great contribution to strengthening labor discipline at the construction site. We need thrifty, party-oriented construction project leaders, as well as for trade-union organizations to lead construction site collectives and brigades more resolutely in the struggle against violations of labor discipline, manifestations of mismanagement, extravagance and irresponsibility, in overcoming such grotesque phenomena as drunkenness, theft and greed. Bolder use of brigade and brigade leader opinion and of comrades' courts must be made in strengthening labor and production discipline. Perfecting moral and material incentives must also pursue this same goal. Observing labor discipline is an enormous reserve for increasing capital construction efficiency, just as is observing planning and production discipline.

The CPSU Central Committee, USSR Council of Ministers, AUCCTU and Komsomol Central Committee have stressed, in the decree "On All-Union Socialist Competition for Successful Fulfillment and Overfulfillment of the Assignments of the 11th Five-Year Plan," that the competition slogan must be "Efficient, High-Quality Work!" "Worker Relay," "Not One Lagging Rank," "The Five-Year Plan With Fewer Staff" and other initiatives have found broad dissemination in construction. Leading collectives competing in honor of the 64th anniversary of October completed their annual production assignments by that date. This year, we need to raise the level of all socialist competition organization, to develop it in close connection with practical production assignments. Comrade L. I. Brezhnev said at the 26th Congress: "Socialist competition is the creativity of the masses. By its very essence, it is based on the high awareness and initiative of the people. It is precisely that initiative which helps reveal and bring production reserves into play and to improve work efficiency and quality."

More intensive work must be done to secure personnel. Construction organizations in Lithuania have achieved definite results along this line. Purposeful work was done there to reduce turnover. Improved production and labor organization and, on that basis, higher worker wages were important factors influencing personnel stability in these organizations. Considerable work was done to resolve social and personal-services problems, to provide workers with housing and brigades with good living conditions. Hot food in thermoses was delivered to practically all the large construction projects, and so forth. The experience of Lithuanian construction workers must be widely disseminated.

The recent CPSU Central Committee and USSR Council of Ministers decree "On Intensifying Work on Saving Raw Material, Fuel, Energy and Other Material Resources and Using Them Efficiently" outlined a large program of work on saving the country's material resources and using them efficiently. Each Soviet person, it states, must actively struggle for production and personal economy and thrift and make his own concrete contribution to this national cause. Thousands of construction organizations and construction industry enterprises and tens of thousands of production brigades participated this past five-year plan in the All-Union Public Review of Raw and Other Materials and Fuel-Energy Resources Use Effectiveness organized by the USSR Gosstroy, construction and building materials industry worker trade union central committee, and scientific-technical society of construction industry. In the course of the review, construction organization and enterprise collectives made 1,532,000 efficiency proposals, whose economic impact was 3.3 billion rubles. The branch saved 1.8 million



tons of metal, 7.0 million cubic meters of lumber, 2.3 billion kilowatt hours of electricity and 1.8 million tons of fuel.

A substantial impact, it would seem. However, incomparably greater reserves and unused opportunities remain. They are concealed in considerable measure at construction sites and in construction brigades. A large portion of the savings must be obtained as a result of local reviews of working plans for buildings and structures, by using lighter and more effective components and local materials, by applying new technological resolutions, reducing transport losses, and so on, and at the construction site itself, we must cut down direct waste of building materials, concrete, slurry, lumber, cement, metal, and so on. We must not fail to note that more than half the construction brigades employed at construction sites have yet to review thrift procedures, do little to save materials, and sometimes even simply use too much. Thus, each worker in the collective must respond with deeds to the party's call for saving material and energy resources. The thousands of leading brigades offer an example of this attitude.

I. L. Sinkevich's masons brigade (Pikalevstroy trust, Glavzapstroy, USSR Ministry of Construction) of 17 people obligated itself to save 230,000 bricks and 25 m<sup>3</sup> of mortar during the 11th Five-Year Plan. Astonishing figures for one brigade. Skeptics might doubt they can do it: after all, 230,000 bricks! However, this indicator, which is one percent of the brick actually used and 1.5 liters of mortar per day per mason, has already been met by the brigade collective in the first year of the five-year plan, and the brigade will report in January 1982 that their obligations have been more than met. Only one-percent savings, but nationwide, it would mean 400 million bricks a year!

No brigade in construction can be left out of the review to save material resources.

Nearly 15,000 construction-installation, planning and scientific research organizations, about 5,000 construction industry enterprises and tens of thousands of construction-installation brigades are now participating in the all-union review-contest for best construction quality.

Substantial successes in improving construction quality have been achieved by Glavmosstroy housebuilding combine No 3, Pavlodarpromstroy trusts, Borispol'sel'stroy, Mosstroy trust No 16 and many others. About 150 construction organizations have been awarded diplomas of the USSR Gosstroy, the trade union central committee and the scientific-technical society of construction industry for good construction quality.

At the same time, construction quality as a whole leaves much to be desired. Both the leaders and the brigades must have a decisive say in this large, truly state matter. The former must introduce a quality control system and use it to the maximum to solve problems. But quite a bit of responsibility also rests with the worker collectives. Many of them possess their own "keys" to improving quality. Just a few examples are P. Mkrtumyan's masons brigade and S. Sarukhanyan's plasters brigade of trust No 3, Armenian SSR Ministry of Rural Construction, which won the all-union review-contest for best construction quality. P. Mkrtumyan's brigade releases work it has done to S. Sarukhanyan's plasterers brigade, which releases its work to the painters brigade. Such worker control heightens the sense of responsibility of each implementer and the work as a whole is released exclusively with marks of "good" and "outstanding." Workers in many collectives have other "keys" to improving construction quality, which have been discussed in detail in STROITEL'NAYA GAZETA and in

STROITEL', and this experience of the leading production workers must be used extensively in worker collectives.

Construction collectives stand on the threshold of the second year of the 11th Five-Year Plan. Their task, as governed by the resolutions of the 26th CPSU Congress and November (1981) CPSU Central Committee Plenum, is to work out effective steps to resolve the primary task of promptly putting projects into operation and continue transferring construction onto a path of intensive development, significantly improving work efficiency and quality.

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## CONSTRUCTION

### GOSSTROY OFFICIAL DISCUSSES CURRENT STATE OF DESIGN, BUDGET-ESTIMATING

Moscow STROITEL'NAYA GAZETA in Russian 1 Jul 81 p 3

[Interview with First Deputy USSR Gosstroy Chairman Aleksandr Aleksandrovich Borov by a STROITEL'NAYA GAZETA correspondent: "Good Quality of Design"]

[Text] The conversation of a STROITEL'NAYA GAZETA correspondent with First Deputy USSR Gosstroy Chairman A. A. Borov about ways to improve design and budget-estimating affairs.

[Question] During the 11th Five-Year Plan the builders should, in accordance with the principles of the 26th CPSU Congress, systematically build up the country's production potential on the foundation of modern equipment and provide for the erection of the required amounts of housing and facilities for municipal, personal-amenities, social and cultural purposes. The recently adopted CPSU Central Committee and USSR Council of Ministers decree, "On Measures for Further Improving Design and Budget-Estimating Matters," is also aimed at this. Could you not comment, Aleksandr Aleksandrovich, on the basic principles of it?

[Answer] The policy of intensive development of the country's economy that has been adopted requires the updating and creation of fixed productive capital, taking into account the latest achievements of science and technology. And this means that really modern designs must be developed and approved. For it is these which will, in the final analysis, determine the technical and economic level of the industry and of the whole national economy.

This truth is well known. But, unfortunately, it is not always being adhered to. There are many deficiencies in what is being developed.

The party and government decree requires that everything possible be done to insure that each enterprise that is built or rebuilt be advanced, from a technical point of view, and that it provide for the output of products of high quality, in accordance with scientifically substantiated standards for expenditures of labor, raw and other materials, and fuel-and-power resources.

Of course, the requirement that design quality be raised has been stated previously. But right now the demand for this is being intensified. The country has gained a vast scientific and technical potential, and on that basis it is possible and necessary to solve existing large-scale national economic tasks. And the

first word here is for those who stand at the sources of the construction project. Ministries and agencies have been called upon to answer for the content of what is developed, a matter that is within the jurisdiction of the design organizations.

[Question] Many institutes of various agencies take part in preparing the design of an industrial complex or, simply, of an enterprise. What kind of a role does the main performer and the main "conductor"--the general designer--play under current conditions?

[Answer] Basically, the role is the same. As before, he bears full responsibility for the content and quality of all the developments, especially, of course, for those for which the active portion of the capital is created. No kinds of explanations or references to difficulties can justify outdated solutions, errors or oversights being permitted in the designs. However, as experience indicates, many general designers do not perform their role as they should. They coordinate poorly, and they analyze and guide poorly the activity of all those who participate in preparing technical documentation. They must reorganize their work and establish closer mutual relations on the basis of high state interests and manifest adherence to principles and persistence in research and also during the approval of progressive solutions.

[Question] In rightfully paying special attention to improvement in the quality of the technological content of facilities, obviously the essential significance of the buildings, structures, interdepartmental tracks and spur tracks must be pointed out....For indeed, more than 60 percent of the funds allocated are expended on this.

[Answer] It is true, actually there are still unused reserves in designing the constructional part. One of them--perhaps the most important--is that of raising the level of the industrialization of construction. The decree states that structure and articles with a high degree of factory-produced readiness, modular equipment and effective ways for organizing the work must be used more widely. It is necessary to be more active in improving three-dimensional layout and constructional solutions and transportation schemes for bringing raw materials, fuel and other items into and sending finished products out from the new enterprise.

Especially necessary are purposeful efforts to improve the use of technology and equipment, taking into account the interests of the construction work. I have in mind the creation of that progressive equipment that can be installed on open sites, which will enable advanced methods for installing work to be applied. Enormous possibilities for reducing material and labor expenses are concealed here.

[Question] Design work, it can be said, is the bridge that connects science with production. But not by far do plans for research and the introduction of progressive developments coincide with the plan for preparation of the engineering papers for the construction project. What is to be done to eliminate this important deficiency?

[Answer] This is actually an extremely complicated and difficult problem. Special attention has been paid to it. The decree states that USSR ministries and agencies and Union-republic councils of ministers should require that plans for raising the technical level of the industry call for measures for use of the achievements of science and production in the designs of enterprises and structures. Based on this

It is required that design-work tasks establish specific requirements for the introduction of new technology and advanced experience, indicators of capital investment effectiveness, reduction of materials and labor intensiveness of construction, and growth of labor productivity. The quality of the design will depend to a great extent upon the fulfillment of this extremely important preparatory work.

[Question] It is well known that it is impossible to eliminate radical deficiencies in design work without an improvement in the planning of design-and-survey operations. What kind of changes will occur on the basis of this original policy?

[Answer] I would say considerable changes. You will recall that up until now planning has been conducted practically on the basis of the feasibility studies that have been conducted. The TEO's [feasibility studies] have not enabled the development of the industry as a whole to be seen, taking into account interindustry ties and prospects that are of the highest state and nationwide interest.

Now planning will be based upon schemes for developing and siting productive forces in the country, economic regions and Union republics, and also within the various branches of industry.

In essence, the schemes will become the main benchmarks for the development of the country's whole economy, a practical embodiment of our party's economic strategy in the branches and regions. Here, it would seem, it is wise to emphasize that the development of this document, which is to satisfy all aspects of social life, is possible only where there is a planned socialist economy.

[Question] The quality of the designs, as experience invariably indicates, depends not only upon their content but also upon the time taken to develop them?

[Answer] Of course. If years pass during the preparation of documentation, then it certainly will be obsolete prior to realization, for science and technology these days are being developed vigorously. And enormous capital investment (the large industrial complexes that are being created require this) will not achieve its goals, and the industry will not advance on the path to the improvement of production.

Therefore, a reduction in design periods is an important factor, and this has been reflected in the decree: the procedure is being simplified and the periods for doing the work are being reduced considerably. For most construction projects (uncomplicated enterprises, buildings and structures) engineering documentation should be prepared on the basis of the designated branch schemes, in one stage--the working drawing and its budget-estimated cost of construction. In so doing, the working documentation is prepared simultaneously with the design, but it is not presented for approval.

For large and complicated construction projects, two stages are established: the design with consolidated budget estimates, and, after it is approved--the working documentation. In both cases the amount of work is to be reduced by one-half to two-thirds, especially the work that is presented for approval.

Labor expenditures are being reduced and time spent doing the work is being shortened still more, because the practice of using standard or repeatedly used designs is to be greatly expanded. A number of steps are to be taken for this purpose.



[Question] Practice suggests that institute workers, along with clients and contractors, should think more about executing designs more rapidly and thereby accelerating the turnover of capital investment. And in so doing, it stands to reason, that which is developed will not become obsolete.

[Answer] You have in mind the sequence of design work? It is also a very important principle to prepare documentation for definite phases of construction and for startup complexes on the basis of the master plan's schemes for the construction project.

This was a requirement even before, of course. But, unfortunately, at this stage errors and lack of coordination did occur and are occurring. And often because the designers consider that the client has the deciding word here. And they, in these circumstances, refer to the institutes: it is they, they say, who produce the documentation. The imposition of a strict procedure is required here.

[Question] How many construction projects have suffered because budget estimates were made up incorrectly or with errors?

[Answer] Very many.

[Question] How can they be made more authentic and stable?

[Answer] Let's take a look at the new statute about determination of the budget-estimated cost. First of all, the methodology of computing expenditures is simplified. As a rule, they should be determined in accordance with finished budget estimates for standard and repeatedly used designs and price lists and budget-estimating indicators for similar construction projects. The industry's institutes should accumulate and systematize such data and calculate the actual costs of facilities that have been erected in comparison with the facility being designed. Banks of this information should be accessible to the designers of other industries.

It has been established that, in the case of consolidated estimates for facilities that will require a substantial construction time, the future influence of the factors of scientific and technical and social process on cost, the dynamics of the rise in prices for equipment, structure and materials, as well as change in requirements for output quality and various forecasts, should be considered.

[Question] Surely, it must be said that this is being introduced for the first time in our country?

[Answer] We have actually lost sight of the factors of tomorrow when making up budget estimates.

I would like to recall that the cost of a facility should now be approved for the whole period of construction, and errors committed in determining it will be viewed as a violation of state discipline.

[Question] That is, the guilty will be held strictly accountable?

[Answer] That is completely correct. Strict personal demands on personnel are being established.

[Question] The time set aside for this conversation is, unfortunately, running out, Aleksandr Aleksandrovich. Can you speak, even if briefly, about other measures?

[Answer] The CPSU Central Committee and USSR Council of Ministers decree is, in essence, a broad integrated program that calls for further improvement of the whole design and budget-estimating business. You, surely, have paid attention to this: problems that arise at all stages of design are being solved concurrently. Of course, I would like to speak about all the new principles in order to better present the integrity and significance of the decree. But, not having this possibility at this moment, I will note only one thing: a number of measures aimed at improving conditions for creative work, at raising the quality of design, and at more complete provisioning of institutes with scientific and technical information (a whole program has been adopted here) are to be carried out. It is planned to produce a more efficient system of economic incentives for the quality of the work.

The party and the government have displayed new and great concern for designers. Unrestricted opportunities for effective creativity and for the accelerated development of documentation on a modern technical basis are being opened up for them. It is the duty of institutes to use this potential completely and to provide construction projects of the 11th Five-Year Plan with modern, economical designs and thereby help move our country forward on the path of technical, economic and social progress.

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## CONSTRUCTION

### REGIONAL CONSOLIDATION OF CONSTRUCTION ORGANIZATIONS URGED

Moscow STROITEL'NAYA GAZETA in Russian 28 Jun 81 p 2

[Article by L. Blank, chief of the Technical and Economic Research Division of TsNIIOMTP [Central Scientific-Research and Experimental Design Institute for the Organization and Mechanization of and Technical Assistance to Construction]: "Turn Over to One Main Administration"]

[Text] The Structure and Methods of Management.

On the combining of regional and branch-of-industry management.

A Management Code.

Preceding articles under the heading, "The Structure and Methods for Management," contained proposals for "A Management Code." The editorial board is publicizing them in order to pass them along, with an indication of authorship.

1. Strengthen the basic production element--the association and the combine; and, in order to convert to the turnkey method of operation when erecting facilities for housing and nonindustrial purposes, transfer some specialized installing organizations to the direct subordination of these associations.  
(G. Lubenets, No 57)

2. The optimal number of management elements should be established on the basis of the norms for manageability. In each specific case this can be done on the basis of existing experience, experimental assessments and theoretical analysis.  
(V. Krupenchenko, No 70)

And here is a new recommendation:

3. Determine the economically desirable radius of action of construction organizations. All construction organizations in a given region should be subordinate to one agency, in the form of the main regional administration.



The editorial board invites readers to rate the publicized proposals under a five-point system. We await your ratings and new articles and proposals.

It is well known that the construction of many enterprises has been prolonged for many years. Actual construction time exceeds the standard 1.3- to 1.5-fold, and in some cases 2-fold. In the past decade a trend toward a reduction has been noted in most of the indicators that characterize the operating effectiveness of construction. Growth in labor productivity has slowed, and the amount of uncompleted construction has increased. These trends were occasioned mainly by deficiencies in the system for managing, planning and organizing construction operations.

In the Tatar ASSR, for example, the large construction organizations subordinate to three ministries do only half of all construction and installing work. Another fourth of it is done by 16 trusts that are subordinate to other ministries or agencies. The remaining fourth is distributed among 96 separate small contracting organizations and cost-accountable sections. Construction is organized in similar fashion in many other oblasts and republics.

About 600,000 facilities (financed by all sources, not counting individual construction) are in the construction stage at present. There is an average of 10 workers at each facility, which is one-third to one-fourth the requirement for two-shift operation. Are a substantial reduction in construction time and maximum utilization of the pool of machinery and mechanisms feasible under such circumstances?

Numerous appeals to concentrate resources on a limited number of jobs are not being realized, since agency interests often prove to be stronger than the country's interests. Traditional planning for annual growth in work volume, regardless of the actual local situation leads to construction organizations also not being motivated to reduce the number of facilities being built simultaneously, since, where design and budget-estimating papers are not provided completely and materials are not delivered in complete sets at a multitude of facilities, it is simpler to manipulate the restricted resources.

The attempts of construction ministries to reduce the number of facilities being built simultaneously also often end unsuccessfully because industrial, agricultural and other ministries and agencies create in this case their own construction organizations, dispersing scarce resources still more. In 1980 the Union construction ministries did practically only half of all construction and installing work.

The basic construction ministries, regardless of their designations, erect practically all types of facilities--from kindergartens and apartment houses to industrial complexes. Minmontazhspeystroy [Ministry of Installation and Special Construction Work] installs under subcontract steel and reinforced-concrete structure that is not now related to special types of operation.

The complexity of the management of construction operations is caused primarily by its specifics, which basically distinguish it from other branches of the national economy. The specifics include the fact that the construction product is stationary, yet the production work and its fixed capital and labor collectives should be mobile. Since a portion of the fixed capital (the construction base) cannot in most cases be mobile, and yet the redeployment of the working collectives often

contradicts the personal interests of the workers, an economically desirable radius should be determined.

Consequently, in the overwhelming majority of cases, the basic prerequisite for raising management effectiveness is the existence of a substantial and stable amount of annual construction and installing work within a restricted area. This prerequisite exists objectively almost everywhere, but it can be realized only where all construction organizations in the area are subordinated to a single agency.

In considering what has been said, specialists of the Technical and Economics Research Division of TsNIIOMTP opine that the territorial elements of construction-operations management must be strengthened. All contracting organizations that are constructing, rebuilding or overhauling buildings and structures within one oblast (or kray or ASSR) should be subordinated to the regional main administration.

The regional administration would become a part of a general-construction contracting ministry, whose activity would be spread over a number of adjacent oblasts, krays and republics. An exception would be only the specialized organizations of appropriate ministries (of Minenergo [Ministry of Power and Electrification], Mintransstroy [Ministry of Transport Construction], Minneftegazstroy [Ministry of Construction of Petroleum and Gas Industry Enterprises] and Minmontazhspetsstroy.

The concentration of all questions of planning and current management (including the production base) in a regional organ creates a real opportunity for restricting the number of facilities being built simultaneously within a given region, in accordance with the available resources and taking into account the organization of work at each facility in at least two shifts.

Undoubtedly it will be better that the capacity of an in-house production base for construction work be used. This capacity can be brought into correspondence with the requirements of the contracting organizations, both those that are subordinate to the main regional administration and the specialized organizations, whose capital investment requirements are sharply reduced in this case for the creation of their own production base.

There is a real possibility for building up the strength of primary construction organizations to an optimum level and for creating high-capacity trusts and associations and specialized organizations.

In considering the strong influence of natural and climatic conditions (the country's northern zone, the high-seismicity zone, and so on) on three-dimensional layout and constructional solutions, it obviously is desirable to change somewhat the sphere of activity of the construction ministries. The regional main administrations that are working in the country's northern zone, the Caucasus and Central Asia, the European part of the USSR, and the Asiatic part (less the northern zone) will be subordinate to four general-construction ministries. The trusts and associations that are erecting linear-type and special facilities will be subordinate to the corresponding specialized ministries, which operate in all parts of the USSR. Such a structure, in our view, would result in a more complete combining of the branch and regional principles of management.

Improvement of the management structure, as the preceding articles on this topic correctly note, should be combined with precautionary measures. It is desirable to establish monitoring over the procedure for transferring production capital from one agency to another, to retain the existing system for supplying materials and equipment, and to extend services to construction organizations that are being transferred for at least 1.5-2 years after the transfer. Otherwise, the provisioning of a construction project with all types of resources can be worsened.

It is desirable to require that financing and the appropriate monitoring of the activity of contracting organizations that are building, rebuilding, or overhauling buildings and structures be accomplished only by USSR Stroybank organs. Rules for planning the number of facilities that are being built simultaneously should be worked out and the appropriate data introduced into state reporting.

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## CONSTRUCTION

### STUDY SHOWS MONOLITHIC CONSTRUCTION BEST FOR ARMENIAN SSR HOUSING

Yerevan PROMYSHLENNOST' ARMENII in Russian No 7, Jul 81 (signed to press 15 Jul 81)  
pp 66-67

[Article by E. V. Pogosyan, senior scientific worker of ArmNIISA [Scientific-Research Institute for Construction and Architecture of the Armenian SSR]: "The Desirability of Developing Monolithic Housing Construction in the Armenian SSR"]

[Text] We continue discussion of the problem.

The basic constructional system used in our republic when building apartment houses more than nine stories high is the frame-and-panel system and its modifications. Building apartment houses in this version has made it possible to diversify the housing buildup by creating dominating features out of 12-, 14- and 16-story buildings. Since, from the economic point of view, frame-and-panel housing construction methods are not effective enough for housing construction, even of high-rises, a decision was made to convert to the manufacture of structure for large-panel housing as the existing equipment for frame-and-panel housing construction is amortized. In accordance with USSR Gosstroy and USSR Gosplan decree No 150/105 of 20 September 1976, the construction of apartment houses from frame-and-panel structure should be strictly limited. Because of this, a reduction in the share thereof in overall housing construction was called for by the planning structure, from 38.1 percent in 1976 to 25.6 percent in 1980 [1].

Definite difficulties arise also in converting enterprises that build fully-prefabricated apartment houses to the output of the new series of apartment houses, which, as a rule, involve the increase in capital investment that is necessary for reorienting the existing production base. According to the specialists' computations [2], 30-50 percent of the molds have to be reset-up for organizing output of the new structure.

When erecting buildings made of fully prefabricated reinforced-concrete structure in regions difficult of access, expenditures are increased for the delivery of structure from the base for fully prefabricated housing construction. The creation of ZhBK [reinforced-concrete structure] plants or KPD [large-panel housing construction] combines in regions difficult of access does not always prove desirable.

Also, the construction of apartment houses on the basis of land sections that are subject to subsidence, necessitating added expense for reinforcing the structure of the buildings and stabilization of the soil, leads to great expense.

The constructional types that are being used for apartment houses and the potential of the republic's construction industry do not at present permit the problems touched upon to be solved effectively enough. In our opinion, large-scale development of the industrialized type of monolithic housing construction, which will increase the total production capacity of the republic's housing construction, will supplement large-panel housing construction and will replace large amounts of small-piece type masonry construction and, partly, the construction of framework-type buildings, will help greatly in solving such problems.

Monolithic housing construction, using progressive methods, will enable the architectural-compositional and urban-development possibilities to be expanded in the designing of housing rayons and social centers, costs and labor intensiveness to be reduced, construction time to be cut in comparison with the traditional methods for erecting buildings, and, what is especially important, all this to be accomplished without relatively large capital investment for developing the production base. Monolithic housing construction is especially effective in southern seismic regions with a long heating period, as is the case in the Armenian SSR.

ArmNIISA has been doing the appropriate research to establish the desirability of erecting monolithic buildings in the republic. An analysis of the economic effectiveness of using industrial methods for monolithic housing construction in the Armenian environment at this stage is possible only at the level of design solutions for apartment houses that are involved in experimental construction, since industrialized construction of monolithic buildings still is not being conducted. A comparative analysis of the constructional solutions for nine-story monolithic and fully prefabricated-monolithic apartment houses that are erected by means of adjustable three-dimensional formwork, and of a nine-story large-panel apartment house, was made by comparing the cost indicators and the consumption of the main building materials. Experimental designs for monolithic and fully prefabricated-monolithic apartment houses have been developed by the Experimental Design Division of ArmNIISA. The standard design for a nine-story large-panel apartment house of the 129 series was adopted as a reference.

A comparative evaluation of the constructional solutions of the designs being analyzed was made on the basis of the "Recommendations" made by NIIES [Scientific-Research Institute for Construction Economics] [3] and TsNIIEP zhilishcha [Central Scientific-Research and Design Institute for the Standard and Experimental Design of Housing] [4], taking into account the standard-practice recommendations in [5]. Two variants in the selection of designs for comparable conditions were examined: designs for prefabricated monolithic, monolithic and large-panel housing (the bases were the three-dimensional layout solutions for fully prefabricated housing with load-bearing wall step of up to 4.5 meters), and designs for monolithic and large-panel housing (the bases are three-dimensional layout solutions for large-panel housing with a load-bearing wall step of up to 5.7 meters).

The results of the analyses (see the table) indicate that buildings erected with three-dimensional adjustable formwork are far more economical than large-panel housing. The budget-estimated cost per square meter of total space of a large-panel apartment house exceeded the same indicator for a fully prefabricated monolithic apartment house by 15.5 percent, or, in comparison with a monolithic apartment house, by 21 percent. According to the adduced expenditures, the fully prefabricated-monolithic and monolithic apartment houses proved to be more economical than large-panel housing by, respectively, 17.6 and 23.5 percent.



Variants	Budget-estimated cost	Specific capital investment in the supply and equipment base for construction	Adduced expenditures
I			
Fully prefabricated monolithic apartment house	<u>103.17</u> <u>84.5</u>	<u>55.88</u> <u>58.9</u>	<u>109.87</u> <u>82.4</u>
Monolithic apartment house	<u>96.41</u> <u>79.0</u>	<u>47.45</u> <u>50.0</u>	<u>102.10</u> <u>76.5</u>
Large-panel apartment house	<u>132.03</u> <u>100</u>	<u>94.83</u> <u>100</u>	<u>133.40</u> <u>100</u>
II			
Monolithic apartment house	<u>101.60</u> <u>92</u>	<u>46.91</u> <u>52.6</u>	<u>107.23</u> <u>88.5</u>
Large-panel apartment house	<u>110.48</u> <u>100</u>	<u>89.18</u> <u>100</u>	<u>121.18</u> <u>100</u>

The numerators are the indicators computed in rubles per 1 m<sup>2</sup> of total space, and the denominators are the percentages of the indicators for a large-panel apartment house, which is adopted as 100 percent.

Moreover, buildings made of monolithic structure were distinguished by low consumption of reinforcement steel. In the design being analyzed, the share of reinforcement (computed per 1 m<sup>2</sup> of total space) in fully prefabricated-monolithic and in monolithic housing was lower than in large-panel housing by, respectively, 25 and 40 percent.

On the whole, the results of the preliminary economic analysis testify to the desirability of building nonframework apartment houses of monolithic reinforced-concrete structure in the Armenian SSR. [in boldface]/

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## CONSTRUCTION

### DESIGNER, CLIENT, BUILDER RESPONSIBILITIES SHOULD BE CLARIFIED

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 2 Jul 81 p 2

[Article by Yu. Rakhmanov, chief of the Main Administration for Economic Planning of USSR Minpromstroy [Ministry of Industrial Construction] (Moscow): "What Puts the Construction Project in a Fever?"]

[Text] Improve the economic mechanism.

I recall vividly conversations with colleagues from other contracting ministries, USSR Gosplan workers, and the planners of main construction administrations and construction trusts in the summer of 1979, when the well-known CPSU Central Committee and USSR Council of Ministers decree about improving the economic mechanism was published.

It seemed to many of us then that this all-embracing document left no unsolved problems. The decree set with precision a strategy--the conversion of capital construction to the rails of planning for commodity output that is more concrete than gross-output planning. An adequate period--1½-years--was specified for perfecting the tactics for introducing and for preparing all elements of the management system for working under the new conditions. Well, then, what do we see when evaluating the first steps of the large-scale introduction of the new system of indicators?

Formally, this year we received from the client ministries tasks for construction commodity output, and USSR Gosplan has approved these tasks. According to our information, and as prescribed in the decree, the client ministries have approved similar tasks for their enterprise developers. However, they approved them in rubles and did not convert them to "in-kind" output. For a large number of important construction projects, our partners have never presented lists of the facilities that are to make up the complexes that are due for early startup. In other words, they have not made the "stove" itself from which the planning of concrete results--the introduction of new capacity--is to be started.

For example, there are still no approved startup complexes for the introduction of capacity at the production association Permnefteorgsintez [Perm' Association for Oil Refining and the Production of Organic-Synthesis Products] of USSR Minneftekhimprom [Ministry of Petroleum Refining and Petrochemical Industry] and the Belgorod-Dnestrovskiy Medical Instruments Plant of Minmedprom and the Minmyasomolprom [Ministry of Meat and Dairy Industry] cheese plants at Zvenigorod and Slutsk, which are under construction. Documentation was presented for the Lyudinovo



Machine-Tools Assemblies Plant and Belorussian motor-vehicle plant of Minstankoprom [Ministry of Machine Tool and Tool Building Industry] and Minavtoprom [Ministry of Automotive Industry], but it was such that it had to be returned for quite serious refinement.

It appears that many economic leaders have proved to be psychologically unprepared for work under the new terms. A persisting stereotype of economic thought, that very one that Comrade L. I. Brezhnev aptly described as "the nonprogressive force of inertia," which impels clients to try for and planning workers to coordinate on inclusion in the plan of more and more new facilities and a maximum amount of capital investment. From this come exorbitant and, at times, even simply excessive growth of the contractors' tasks.

For USSR Minpromstroy, growth this year is almost 17 percent, which is somewhat higher than the average growth specified for the branch for the whole five-year plan. It is clear that under these circumstances the number of facilities being built simultaneously will grow. The statistics indicate that during the Ninth Five-Year Plan our subunits worked on about 14,500 construction projects annually, and, at the end of the 10th Five-Year Plan, almost 19,000. At the beginning of the last five-year plan there were an average of 43 construction workers for each construction project but at the end of the plan period barely 30. Nor has the situation improved this year. Thus the plan, instead of concentrating forces and resources, is laying the base for dispersing them.

Moreover, if construction-time norms are applied to the amount of work at all the construction projects that are included in the plan--and we have done that work by means of computer--then it comes out that USSR Minpromstroy must tackle 10.5 billion rubles' worth of work. But our plan is for 40 percent less. And the plan for the ministry today is limited: there is no free capacity, and a 1½-fold rate of growth thereof in such a short time is, clearly, an unrealistic task.

Nevertheless, it is within our power to put an end to "overdue construction jobs," if we will strictly follow the policy set by the 25th and 26th Party Congresses--the policy of concentrating capital investment, while simultaneously reducing the number of new construction projects. And the new economic mechanism is aimed at precisely this target. It calls for industrial ministries to approve ceilings on state capital investment and on construction and installing work during the five-year plan, the ceilings in the annual plans not being approved, and, therefore, not revised.

Apparently not all economic workers understood the concept of this measure. But it is simple: one now has to answer himself for errors, because the ceilings have covered up the loophole for "beating out" additional grants.

But this was not enough, at first at least, to finally overcome the client's habitual striving, at any price, to include unnecessary items in the plan. In order to deal effectively with the growth of uncompleted construction and to drive to accelerate the introduction of new capacity, it is necessary to improve radically regional planning and to increase, as described in the "Main Directions," its activity and role in the development of regions.

The whole system of planning capital construction was founded on the branch-of-industry principle. But the process itself of creating new capacity is executed in

a completely defined region. What is more, the organizational structure of our industry has a sharply expressed regional nature: there are oblasts, krays and republics--and there are, correspondingly, oblast, kray and republic contracting organizations. And, in essence, it is sufficient to introduce a state calculation of budget-estimated surpluses for facilities that have been begun in a given region to raise appreciably the substantiation of capital construction plans. Such a calculation opens the economists' eyes, enabling them to see the interdependence of a large number of problems in developing and siting productive forces and in increasing the capacity of contracting organizations or in changing their locations in accordance with the amounts of work proposed.

What the lack of such a calculation leads to is well seen in the example of Trust No 3, which operates in Soligorsk. It was established specially for the construction of mineral-fertilizer industry enterprises. The trust's capacity is such that it can do 40 million rubles' worth of construction and installing work each year. However, last year the chemical workers did not have that much work, and the trust was compelled "to seek employment" on the side, soliciting it within a radius of 170 km. In particular, contracts were concluded for the erection of a number of facilities in a rural locality. And now to abandon them at the right time: the Ministry for Mineral Fertilizer Production decided to speed up the introduction of granulated potassium chloride capacity at the Soligorsk Potassium Plant No 4 by a year. According to the design for organizing construction, two startup complexes were to be introduced during the current year and the next year. But there was no such breakdown in the list of construction-project titles, and the turnover of all capacity was called for in December, which was less than half a year away. Since this construction is one of the most important, the trust will "extract" it. But is it not clear that it will be done by curtailing work at other facilities?

As we see, in planning capital construction, dependence upon the "client-contractor-region" line is followed with precision and the feedback effect is hardly felt at all. It is for this reason that the program for the development and growth of capacity of that same association, Beloruskaliy, is being formulated practically solely on the basis of the industry's market interests, while the actual disposition of forces is not considered in the calculation. This also causes strong fluctuations in the amounts of work. And, I repeat, amplifying feedback in planning is enough to correct the situation appreciably.

It is no less important, and this flows from the decree about economic questions, to create a firm juridical basis for the interrelationships between the chief participants of construction under the new economic mechanism. The nature of these relationships, which have been changed in such most important documents as "Standard-Practice Procedures for Compiling the State Plan for Economic and Social Development," "The Rules on Contract Agreements for Capital Construction," and other standardizing and directive documents must be considered.

This concerns primarily determination during the plan formulation stage of the dates for beginning and ending construction. Today the client, in essence, determines personally the date of the startup, being guided at best by construction-time norms. USSR Gosplan workers, when confirming the date, consult, of course, with the contracting ministry. But the latter's opinion does not exert a decisive influence on the final "verdict," as does the opinion of the regional organ. And since no one imposes on the clients the duty of coordinating actions with them, there often occurs a "creeping," a combining in time of the beginning and ending dates of operations at a number of facilities of various branches of the economy.

Here is what happened, for example, in the city of Svetlogorsk. Trust No 20, which is located here, was able to master 17-18 million rubles' worth per year and was loaded to the limit for several years ahead. Since the region is a promising one, we plan to double the trust's capacity. But this job is not at all simple, in view of the personnel shortage. There's no use in making a sudden attack here. One must prepare a base and housing and attract people from outside. This takes time. And where do you get it? Minkhimprom [Ministry of Chemical Industry] has already had preliminary USSR Gosplan consent for the erection of the second phase of an artificial-fibers plant at a cost of about 76 million rubles, the dates being such that, for this object alone, the trust must assimilate at least 20 million rubles annually. During that same period it is also planned to build a large foundry. In order to stay within the time norms here, the trust must assimilate another 10-15 million rubles per year. Thus the current capacity must be almost tripled. And this, even with maximum help from the client, is realistic for no earlier than the end of the five-year plan.

In order that there will be no such "extra burdens" in the future, it is necessary at least to equalize the rights of clients, contractors and local planning organs at the plan-formulation stage. And at the terminal stage, it is necessary to equalize the responsibility of the construction participants, something which flows directly from the July 1979 decree and 26th Party Congress decisions. In order that the new economic mechanism may operate with maximum effectiveness, in our view, a firm juridical basis for determining the specific fault for an interruption is needed.

So far only the contractor bears real responsibility for the timely and integrated introduction of a facility. And the punitive measures are fairly severe. For not carrying out the plan for commodity output, a contractor cannot settle accounts with the bank, augment his working capital, or receive a profit, and, consequently, material incentive funds. Moreover, the bank charges higher interest for the use of credit.

And the clients, designers and suppliers of equipment and materials?

It would seem that the "Rules on Contract Agreements" must stipulate a system of measures for action against them also. For example, endow workers of the commissions that accept capacity and facilities with the necessary rights. The commission will determine in its report the actual state of affairs during the month prior to turnover, with the report itself serving as a juridical basis for determining the degree of responsibility and the responding measures.

Let us say that if it is established that repeated changes have been introduced into the design at the client's request, then it is he who is obligated to intercede with the planning organs for a change in the deadline for introduction and to compensate for the financial harm caused the partners. The same for the designers. Design institutes are highly profitable organizations. They easily part with the 50 rubles that they are being fined today for each day of tardiness. But if the director finds that a fine will absorb a considerable portion of the cost of all the work on a given order and of the institute's bonus fund, then the attitude toward deadlines stemming from a contract will be different.

And there is more. Is it not time to refrain from the free and irrevocable distribution of capital-investment funds? It would seem that a system for granting clients credits through the bank should replace this procedure. Together with ceilings on state capital investment, this would be for developers an extremely powerful stimulus to live, as is said, within their means: when you build with credit, it will be entirely unprofitable "to beat out" of USSR Gosplan excessive millions of rubles and excessive line items in lists of construction projects.

It would be precipitous to suppose that these measures will help to solve all urgent questions. But there is no doubt that they will put order into the work of the construction assembly line and make it operate more rhythmically.

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## BUILDING MATERIALS

### COORDINATED PATENT INFORMATION IN BUILDING MATERIALS INDUSTRY NEEDED

Moscow STROITEL 'NYYE MATERIALY in Russian No 10, Oct 81 (signed to press 23 Sep 81) pp 21-22

[Article by Candidate of Technical Sciences Yu. L. Morozov and Engineer L. Ye. Zavadskaya (NVIIESM): "Improvement of the Industry's Patent Information System"]

[Text] Scientific and technical progress in the building materials industry requires the continued perfection of the industry's patent information system. Our country has basically evolved a unified patent information system. The "Statute of the State Patent Information System" has been approved. This document regulates patent information activity in our country.

The State Patent Information System (SPIS) is a specialized subsystem of the State Scientific and Technical Information System. The Statute defines the SPIS as a network of interrelated information agencies of the USSR State Committee for Inventions and of patent information services provided by territorial and central sectorial scientific and technical information agencies, associations, enterprises, organizations and institutions engaged in coordinating activities for the acquisition, processing, storage, retrieval and distribution of patent information. The Statute defines the basic tasks of all the SPIS's organizational units in the sphere of patent information. Accordingly, patent information agencies of all-union status--the NPO [Science-Production Association] "Poisk" and the All-Union Patents and Technical Library--have the task of acquiring and providing centralized multi-aspect processing of patent documentation appearing around the world.

Territorial patent files are built up with due account of the specifics of economic development in the given region. The patent information services of central industrial and scientific and technical information agencies (TsOONTI) have the task of providing methodological supervision and of coordinating the acquisition and effective utilization of patent files kept by the industry's agencies, and of improving the industry's patent information system.

Besides the information agencies of the State Committee for Inventions, the SPIS also includes head agencies specialized according to sub-industry and subject-matter, which are responsible for patent file acquisition in specific



fields. The USSR Ministry of Building Materials has 25 such head agencies in its system. They replenish their files with descriptions of inventions under headings of the International Classification of Inventions [ICI]--across the board when the headings cover the topics of scientific research and experimental design work being carried out, or selectively picking invention descriptions in other topics; in fields covering coordinated scientific-research and experimental design work, they acquire abstracts and bibliographical information on inventions, that is, they build up data retrieval software for the patent file.

The USSR Ministry of Building Materials' patent file is made up of specialized files maintained by file-holding organizations, which are replenished in a centralized fashion according to their topical headings.

By 1981, the head institutes of the industry had produced 5,126 inventions, most of them coming from the institutes NIItsement [Cement Scientific-Research Institute], VNIInerud [Nonmetallic Ores Institute], VNIItrom [Building Materials Institute], UralNIItromproekt [Urals Building Materials Design Institute], VIASM [Industrial Building Materials Automation Institute], VNIItroypolimer [Building Polymers Institute]. The institutes' patent files vary in size. The biggest files of descriptions of inventions are kept by the NIItsement, GIS [Glass Institute], VNIInerud, and VNIItroypolimer, which corresponds to their greater number of actually protectable themes, as well as by NIItroykeramika [Building Ceramics Institute], VNIItrom, VNIItproektazbest [Asbestos Design Institute], NIIKS (Yerevan) [Stone and Silicate Institute], and NIItkeramzit [Keramizit Institute], where the number of such topics is far fewer.

In recent years there has been a sharp increase in the number of descriptions of Soviet inventions in the files of head institutes, while the number of descriptions of foreign inventions has been increasing to a lesser degree, which reduces opportunities for carrying out patent studies on the basis of those institutes' own files.

At present only seven head institutes have made their files available to other organizations. These are the GIS, VNIInerud, VIASM, NIISM [Building Materials Institute] (Minsk), and others.

The head institutes have translations of descriptions of foreign inventions, thematic collections and analytical reviews, but their files of companies and of analogous patents are very small. A qualitative and quantitative analysis of available files reveals that they duplicate one another, contain too many data units even in selectively acquired files, and there is a disproportion between the volume of the data retrieval apparatus and the number of invention descriptions, which complicates utilization of the files.

In our opinion, the shortcomings of decentralized acquisition can be overcome by introducing elements of centralization. It is necessary to distribute current bibliographical data, mainly foreign, stored on magnetic tapes of the NPO "Poisk", in a centralized manner through the VNIIESM [All-Union Scientific-Research Institute of Information and Economics of the Building Materials Industry] on the basis of data requests from file-keeping organizations, classified under ICI headings according to subject-matter.

It is impossible to develop effective forms of building up specialized files of the volume we have in our industry and at the same time improving the methods of their utilization without an automated patent information system in the ASNTI-SM [Automated System of Scientific-Technical Information--Building Materials] framework. The work being done to create an industry-wide ASNTI-SM automated system of scientific and technical information requires the improvement of data acquisition by the specialized patent files of head institutes.

Under an agreement with the International Center of Patent Documentation (INPADOK), the NPO "Poisk" participates in international exchanges of bibliographical information pertaining to inventions on machine-readable media. The summary magnetic tapes received from INPADOK contain bibliographical data on inventions from 48 countries.

Centralized file acquisition by patent agencies of the USSR Ministry of Building Materials is effected mainly through VNIIESM [Industrial Building Materials Information and Economics Institute], which provides the head organizations of its branches of industry with current patent information in the selective data distribution [IRI] mode; they, in turn, pass this data on to organizations and enterprises in their respective sub-industries that express interest in them. This first experimental form of servicing subscribers represents a downflow of patent data on individual topics; the data requests are submitted in terms of ICI headings and recorded in computer format. The resultant paper medium from "Poisk" magnetic tapes contains the following bibliographical data: country of publication; date of publication; type of document; its number; country of convention priority; claim registration number; date of claim submission; date of submission of convention claim; ICI index; last name, first name and patronymic of inventor; name of firm (last name, first name, patronymic of claimant); title of invention.

An analysis of the data flow of signal patent data on the new type of physical information medium--a magnetic tape printout--revealed a great number of analogous patents: 37 percent of the total number of documents. However, initial utilization of this information on a printout in the form of an index caused certain difficulties in file-keeping organizations.

The methodological recommendations prepared by VNIIESM will help to improve the organization of patent files in head and non-head institutes and to make the best use of them in patent research.

The second form of experimental servicing of subscribers is input of topical headings of organizations of the industry into an automated system of data acquisition based on INPADOK magnetic tapes which is operated by the Leningrad branch of the Production-Printing Enterprise (PPP) "Patent." Subscribers receive signal data in the form of monthly indexes. Then, as invention descriptions come in, microfilms are made of them and forwarded to VNIIESM, which issues them to subscribers.

Eventually VNIIESM will be receiving summary magnetic tapes corresponding to industrial thematic headings for further distribution of information among subscribers, while the Leningrad PPP "Patent" branch will provide organizations

only with selectively copied descriptions. As it receives the information from the NPO "Poisk," VNIIESM will deal with practical problems of providing the industry with patent data, including notification of clients, centralized development of data retrieval software, coordination and monitoring of file acquisition by specialized file-holding organizations, input of bibliographical data on inventions into the industrial ASNTI-SM, etc.

When the file-holding organizations receive INPADOK bibliographical data they must do the following: organize forecasting, determine development trends in different scientific and technical fields, carry out qualitative analyses of data flows and select materials for further study, develop indexing systems for supplying patent information to users in their own organization and in organizations in adjoining fields within their sub-industry.

The patent files being set up in head institutes are a base for patent data studies, which are obligatory under the industrial standard, "Patent Studies. Organization and Procedures" (OST 21-46-80).

The results of patent studies are used extensively in planning scientific research and experimental design work, in evaluating their results, planning and executing patent licensing and export operations, and in quality evaluation of products.

Since patent studies must be performed to substantiate thematic plans of scientific research and experimental design work, reports on them should reflect attained world technology standards as well as the scientific and technological potential of leading firms and organizations in the given field.

More extensive use of patent data materials in organizations within the system of the USSR Ministry of Building Materials will make it possible to make highly effective inventions on their basis, which will contribute to the economic development of the industry.

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## METALWORKING EQUIPMENT

### REGIONAL FACTORS IN MACHINEBUILDING PRODUCTION DISTRIBUTION

Moscow PLANOVVOYE KHOZYAYSTVO in Russian No 11, Nov 81 (signed to press 6 Oct 81) pp 79-85

[Article by Production Forces Study Council sector chief A. Lyovin (USSR Gosplan): "The Nation's Machinebuilding Complex: Regional Problems"]

[Text] The forward growth of the economy and retooling of industry, agriculture and the nonproduction sphere depend in decisive measure on the rate and scope of machinebuilding development. Its technical level determines opportunities for using highly-productive energy- and materials-conserving technologies in all branches of the national economy.

Domestic machinebuilding has a powerful scientific-technical and production potential. In recent years, substantial changes connected with improving the structure of machinebuilding and raising its technical level have occurred in the branch. The proportion of machinebuilding and metalworking output in total industrial output volume has increased from 16.7 percent in 1965 to 27.9 percent in 1979. The branch's proportion of industrial-production fixed assets has risen correspondingly, from 19 to 23.3 percent.

Outstripping rates of growth in machinebuilding output relative to other branches of industry have been achieved. We have mastered the production of equipment and apparatus for precision machinebuilding, machine tool manufacture, electrical engineering, radio-electronics and tool making industry, light and food industry, as well as the nonproduction sphere. The tasks of providing agricultural production with equipment have been resolved successfully. There have been qualitative advances in equipment production. Many types of highly productive automated lines, power and electrical engineering equipment and machine tools have been mastered. Machine tools with numerical preset control have been widely introduced.

Steps to mechanize and automate production and raise the level of capital available to labor have permitted us to free, hypothetically, about 10 million workers for other jobs in machinebuilding branches during 1965-1980, more than 540,000 in chemical and rubber-asbestos industry, nearly 1.7 million in fuel industry, and so on.

Nationwide, machinebuilding and metalworking total output growth rates during 1960-1970 were 313 percent, and they were 241 percent during 1970-1979. In the eastern regions of the country, they were above the union average. Advances have been planned in improving the distribution of machinebuilding.

The materials of the 26th CPSU Congress stress that choosing the most effective directions in the development and distribution of machinebuilding, a branch which actively influences the resolution of socioeconomic problems, will acquire very important significance in the 11th Five-Year Plan and subsequently. Reliance must be placed foremost on creating a system of tools of labor, on modernizing and updating the existing stock of machinery and equipment, on lowering output materials-, capital- and labor-intensiveness, on accelerating the development of branches providing the national economy with means of mechanization, on distributing specialized enterprises, individual production facilities, branches, large and medium-sized enterprises characterized by high labor-intensiveness, in small and medium-sized cities. At the same time, the technical level and territorial proportions of machinebuilding do not meet the modern demands of the economy. In spite of its rapid growth, domestic machinebuilding is not fully resolving the tasks facing us in the area of updating the existing stock of machinery and equipment or in comprehensively mechanizing and automating production. At the same time, the extensive mechanization of manual labor, loading, unloading and transport jobs is extremely important given the decrease in increment in the able-bodied population.

When determining the fundamental directions in which to develop machinebuilding and metalworking branches, full consideration should be given to regional conditions, to the demand for machinebuilding output in zones and large regions, to the availability and migration mobility of labor resources, to differentiating levels of expenditures on workforce reproduction, to the evolved production capacities balance, to the raw material and energy base, to developing intra- and interregional cooperative ties, and so on. It is necessary that the country's machinebuilding complex reflect a combination of machinebuilding branches of union, zonal and regional specialization. Intra- and interbranch production ties must be optimum from a national economic viewpoint. At the same time, insufficient consideration is being given to regional conditions and factors when planning the development of machinebuilding branches.

A number of major regional problems arise when shaping the machinebuilding complex. One is connected with choosing the most effective direction in which to develop machinebuilding in the national economic complexes of the country's economic regions, with establishing optimum interregional proportions. The complexity of resolving this particular problem is determined by substantial differences in level of machinebuilding development by economic region. Thus, the proportion of machinebuilding and metalworking in a number of economic regions of the European USSR is 33-37 percent, while it is 17-19 percent in the Kazakhstan and Central Asian economic regions. Another serious question is the relationship of economic region machinebuilding specialization to its specialization in the unionwide division of labor. At present, machinebuilding specialization in the country's eastern regions and a number of economic regions of the European USSR, for example, does not correspond to their national economic specialization, reducing production efficiency. One important problem is the continued development of the most progressive forms of territorial organization of machinebuilding production. The long-range shaping of branch complexes such as the Minusinskiy Electrical Engineering Complex, Abakanskiy Rail Car Building Complex, Atomash and interbranch machinebuilding complexes is promising. However, insufficient use is being made of this form of specialization. Regional complexes to produce parts, subassemblies and blanks for general machinebuilding application have not received proper development.

It is important to note the multidirectivity of the influence of regional factors and distribution conditions on the effectiveness of shaping the country's machinebuilding

complex and their high dynamics over time. Under the impact of scientific and technical progress, the regional differentiation of aggregate expenditures varies significantly. At the present level, the structure of adjusted expenditures on the production of machinebuilding output is as follows: expenditures on creating fixed assets and strengthening the raw material base comprise 50-56 percent, those on developing the social infrastructure -- 9-11 percent, wages -- 27-29 percent, and others -- 7-14 percent. At present, adjusted expenditures on siting metals-intensive production in the Western Siberia and Far Eastern economic regions are higher than in the Central economic region, 10-15 and 25-30 percent, respectively. In siting particularly labor-intensive and high skill production, this excess is 18-25 and 28-37 percent, respectively. In the future, given an overall reduction in adjusted expenditures per unit of output, a slight reduction in regional differences is anticipated in a number of machinebuilding branches. Thus, for a number of metals-intensive types of production, differences in adjusted expenditures between the Western Siberia and Far Eastern economic regions, on the one hand, and the Central economic region, on the other, will be 5-7 and 10-15 percent, respectively, and for certain labor-intensive types of production -- 2-5 and 8-12 percent. In the future, we plan large changes in the operation of other regional factors and distribution conditions such as the regions' demand for machinebuilding output, the availability of metal, fuel, electricity, labor resources and industrial enterprise construction sites to the regions, and so on. Under these conditions, evaluating the impact of regional factors on the effectiveness of developing the country's machinebuilding complex is of very important significance.

The achieved level of development and evolved distribution of branch enterprises should be included among the basic economic factors determining regional features of machinebuilding development. The main scientific-technical and production potential of machinebuilding is concentrated in the European USSR. It accounts for about 90 percent of nationwide machinebuilding and metalworking output. Siberia and the Far East produce 6.1 percent of machinebuilding gross output and Central Asia and Kazakhstan produce 4.1 percent.

The country's economic zones differ substantially, not only in terms of scope of machinebuilding development, but also in terms of branch structure, conformity of zone national economic specialization to interbranch ties, and other indicators having a great influence on the effectiveness of machinebuilding branch distribution.

The machinebuilding production facility complex in the country's European portion is represented by 32 branches and types of production. The economic regions here are distinguished both by completeness of branch specialization and by level of specialization. The most complete complex of machinebuilding branches and production facilities is in the Central, Donetsko-Pridneprovskiy, Urals, Southern, Northern Caucasus, Volga and Northwestern economic regions. The complex of machinebuilding branches and production facilities is relatively limited in the Moldavian SSR and in the Central-Chernozem and Volga-Vyatskiy economic regions.

Machinebuilding in the Northwestern, Central, Baltic and Transcaucasian economic regions is specialized for the most labor-intensive types of production requiring skilled labor and the least possible materials-intensiveness (machine tool building, tool-making, bearing and electrical engineering industry). The Belorussian economic region is one of automotive and tractor manufacture, radio and electrical engineering industry. The specialization branches in the Northern Caucasus economic region are

When analyzing scientific-technical and production machinebuilding potential in the European portion of the country as the most important factor in branch development, we need to delineate two aspects: the interconnection of machinebuilding branches, deepening the social division of labor and, on that basis, perfecting the forms of production organization. According to 1972 interbranch balance data, the proportion of individual machinebuilding branches in overall production expenditures was 37 percent for power machinebuilding, 39 percent for electrical engineering output, 41.5 percent for forging and pressing equipment, 45.5 percent for apparatus, 62.5 percent for lift-transport equipment and 67.5 percent for construction and road-building equipment.

The machinebuilding potential created in the European portion of the country is a prerequisite for the most effective interbranch cooperation and, on the strength of that, for significantly reducing transport expenditures. The influence of this scientific-technical and production potential on the effectiveness of branch territorial development is manifested in a deepening social division of labor and in the improved forms of production organization which occur on that basis. The deepening of specialization has occurred more intensively in automotive, electrical engineering and tool-making industry; it has been considerably slower in heavy and power machinebuilding, machinebuilding for stockraising and feed production, as well as machinebuilding for light and food industry.

The present stage of machinebuilding development in the European portion of the USSR is characterized by a number of features stemming from the general state socioeconomic and demographic situation as laid out in the CPSU Central Committee Accountability Report to the 26th Party Congress. A majority of the enterprises of this branch are distributed here in the large and largest cities, in which we are already observing the negative consequences of extreme production concentration: personnel turnover, restrictions on site expansion resulting from the depletion of industrial sites, difficulties in heat, fuel and water supply and in providing transport, complexities in attracting labor resources, and so on.

The basic direction in increasing the machinebuilding potential of the large industrial centers is to combine in an optimum way enterprise renovation and retooling with the creation of branches in small and medium-sized cities. In order to actualize this direction, we need to build a large number of specialized enterprises. The size of the economic impact and the relative reduction in the number of people employed in machinebuilding branches will depend in considerable measure on the level of parts and technological specialization.

The formation of a major minerals, raw-material, power, petroleum and gas center in the country's East has required continued development of and improvement in the machinebuilding complex in eastern regions of the USSR. For example, from 1960 through 1980, machinebuilding and metalworking output volume in the eastern regions of the USSR increased more than 5.7-fold. However, the share of the eastern regions of the USSR in unionwide machinebuilding and metalworking output only increased from 10 percent in 1960 to 10.2 percent in 1980. The machinebuilding base of the Western Siberian economic region represents a large group of machinebuilding and repair enterprises. The region is specialized to produce machine tools, forging-pressing equipment and



foundry equipment, large and small steam boilers and electrical engineering output. Machinebuilding and metalworking in Eastern Siberia and the Far East is characterized by a higher proportion of mechanical repair enterprises than the national level, by a limited branch structure, by small- and intermediate-series production, and by a low level of commodity specialization.

The production of electrical engineering items and agricultural equipment has been developed most in the Central Asian republics and Kazakhstan. In recent years, a number of large machinebuilding and metalworking enterprises and many repair centers have become operational.

Using machinebuilding potential in the country's East has a number of features. First, the machinebuilding complex of Siberia, the Far East, Central Asia and Kazakhstan corresponds to the national economic specialization of these regions to a lesser degree than in the European USSR, and the machinebuilding complex supplements it. This is expressed in branch specialization, in inter- and intrabrand ties and in cooperative product deliveries. The bulk of the output of machinebuilding enterprises of the eastern regions is delivered to the European regions of the country. At the same time, the requirements of the eastern regions are being met by deliveries from the European portion of the country as, for example, 70-75 percent of its power equipment requirements (100 percent in the case of turbines) and 80-90 percent of its needs for tractors, automobiles and many types of electrical engineering equipment. Specializing machinebuilding enterprises of the eastern regions to produce output needed here will permit a sharp reduction in transport expenditures.

Second, the eastern regions have the conditions needed to combine the formation of large branch complexes with the construction of specialized plants in small and medium-sized cities. It is more appropriate to create branch complexes in Siberia and the Far East. But, in view of the necessity of resolving the social problems in the southern regions of Kazakhstan and the Central Asian republics, the construction of lead plants and a far-flung system of branches specialized for individual stages of the technological processes is a progressive form of production organization there. The use of such forms of production organization in Siberia, the Far East and the Central Asian republics is favored by the settlement and transport systems which have evolved here and also by the availability of sites for industrial and municipal services construction, and so forth.

Regional requirements for machinebuilding output and changes in the availability of fuel, energy, water and labor resources are very important conditions in developing and distributing machinebuilding. In the economic literature on questions of distributing socialist production, the factor of regional requirements for machinebuilding output have been studied basically with regard to transport expenditures. This treatment does not enable us to fully reveal the influence of this factor on the effectiveness of machinebuilding production. In working out and creating equipment, consideration must be given to the conditions existing in those regions in which it will be operated.

One typical example of the influence of regional demand on machinebuilding development is the situation in coal and mining machinebuilding. The series equipment being produced basically at enterprises of the Ukrainian SSR is used more effectively in the Donbass and less effectively in Kazakhstan and Siberia. Due to the separation of design and testing centers, equipment corresponding to operating conditions in the eastern regions is being developed slowly.

Territorial advances in developing branches of the national economy are causing big changes in regional machinery and equipment requirements as well, as is borne out by research evaluating demand in the country's economic regions which has been one by branch planning institutes and the SOPS [Production Forces Study Council] attached to the USSR Gosplan. It first delineated a complex of machinebuilding branches providing extractive industry with equipment. The shift in extraction of coal, petroleum, gas and a number of minerals to the eastern regions has caused an increased demand for corresponding equipment here. Thus, the distribution of demand for petroleum and gas extracting equipment will look like this in the future, by economic zone: the European regions and Urals will account for 28-35 percent, Siberia and the Far East -- 55-60 percent, Central Asia and Kazakhstan -- 10-12 percent. At present, the demand of the eastern regions for chemical and petrochemical industry equipment is about 15 percent of the union total (but is significantly higher for individual subbranches).

Big shifts will occur in regional demand for power and electrical engineering equipment. Under present conditions, the proportion of the European portion of the country in unionwide demand for power and electrical engineering equipment is 65-70 percent, of Siberia and the Far East -- 15-20 percent, and of Central Asia and Kazakhstan -- 10-15 percent. The regional demand ratio will change less for agricultural equipment, machine-tool manufacture, automotive industry, nuclear machinebuilding and machinebuilding for light and food industry.

The country's economic regions (sub-regions) differ substantially in terms of availability of metal, fuel, electric power, water and other natural and labor resources, as well as in terms of their cost. The Ukrainian SSR and the Urals, Northwestern, Central-Chernozem, Western Siberian and Kazakhstan economic regions are characterized by a high level of metal production, as the country's major metallurgical centers are located there. Ferrous metallurgy plant production volume is significantly less (and least of all, electric steel smelting) in the Central, Volga-Vyatskiy, Volga, Transcaucasian and Far Eastern economic regions. This trend will continue in the future, although with more intensive development of the metallurgical base in the country's eastern regions.

A decrease in the working-age population increment is anticipated in all regions of the European portion of the country (except for the Northern Caucasus economic region). It will be more significant in the Northwestern, Central, Volga-Vyatskiy and Central Chernozem economic regions and less significant in the Volga, Urals and Baltic economic regions. Rapid population growth is expected in the Moldavian SSR and in the Kazakhstan, Transcaucasian and Central Asian economic regions.

One important aspect of analyzing regional machinebuilding distribution factors and conditions is to determine trends in changes in regional differences in the cost of metal, fuel, electric power, expenditures on utilizing industrial sites, water supply, and so on. At present, there are no generally recognized economic evaluations of natural resources, raw and other materials, fuel and electric power which are suitable for use in forecasting and planning the development of national economic branches.

In view of the fact that all the components of expenditures on branch and association production are calculated on the basis of wholesale prices and rates, branch work results do not reflect and do not describe its national economic effectiveness.



For example, the effectiveness of social production is lower when energy- and water-intensive enterprises are sited in eastern regions than when they are sited in the European portion of the USSR. Table 1 gives the results of calculations on choosing a machinebuilding enterprises distribution variant.

Table 1. Comparative Evaluation of Enterprise Distribution Effectiveness (author's calculations)

	regions of distribution		
	Central	Western Siberian	Kazakhstan
evaluation based on wholesale prices and rates			
capital investment, million rubles	409.8	450.2	463.4
adjusted expenditures (effectiveness coefficient 0.12), million rubles	124.6	145.2	150.9
current expenditures:			
million rubles	75.4	91.2	95.3
percent	100	116.5	121.1
differentiated evaluation			
capital investment, million rubles	409.8	337.1	361.5
current expenditures, million rubles	75.4	67.5	70.5
adjusted expenditures (effectiveness coefficient 0.12):			
million rubles	124.6	107.9	113.9
percent	100	87.0	91.0

A comparison of the results of calculations made using the different methods of evaluating live labor, materials, fuel and electric power leads to different conclusions as to the effectiveness of territorial relationships in branch and association development. It is important to decide the question of instituting in this country prices differentiated by economic region for raw and other materials, fuel and electric power, the question of working out a system of machinebuilding effectiveness indicators which takes into account both branch and regional conditions of development.

The calculations made at the SOPS show that regional differentiation for metal is one- to 1.5-fold, for fuel -- three- to four-fold, for electric power -- two- to three-fold, and for water resources -- four- to five-fold. The construction-installation work cost increase factor fluctuates between 0.99 and 1.60, and the equipment cost factor, from one to 1.35, with consideration of equipment delivery to the construction region (see Table 2, following page).

Transport expenditures for delivering raw and other materials, fuel, electric power and finished products to consumption regions also differ substantially. According to the calculations, differences in expenditures on shipping one ton of freight reach a factor of two or three, depending on the region.

Reflecting regional differences in overall expenditures on production and output delivery to consumers is a most important criterion in determining the effectiveness of enterprise distribution by territory. Calculations of comparative economic effectiveness by siting variant for large machinebuilding complexes relating to different

Table 2. Expenditure Differentiation Indicators By Major Region of the Country

region	increase coefficient		calculated expenditures for:		
	cost of construction-installation work	wages	electric power, in rubles/mW	fuel, in rubles/ton of conventional fuel	water, rubles per 1,000 m <sup>3</sup>
Northwest	1.0 - 1.43	1.0 - 1.8	11-13	19-22	5-10
Center and southern European USSR	1.0	1.0	10-12	18-20	30-50
Urals	1.0 - 1.06	1.1 - 1.2	8-11	13-15	40-60
Kazakhstan, Central Asia	1.04 - 1.37	1.0 - 1.3	8-11	14-16	50-70
Siberia	1.04 - 1.27	1.0 - 1.5	7-9	3-7	5-10
Far East	1.34 - 1.38	1.2 - 2.0	12.14*	16-18	--

[\*as published]

groups of production facilities (metals-intensive, labor-intensive, of union and zonal specialization) show that regional differentiation attains significant values in overall expenditures on their construction and production operation (Table 3).

Table 3. Adjusted Expenditures By Branch Machinebuilding Complex Siting Variant

economic region	total capital investment, million rubles	national economic net cost, million rubles	adjusted expenditures, effectiveness factor of 0.12	
			million rubles	percentage of expendi- tures in Central Chernozem region
complex of regions with high metals-intensiveness				
Central Chernozem	5,165	1,280	1,900	100.0
Western Siberia	5,335	1,240	1,880	98.9
Eastern Siberia	6,295	1,425	2,180	114.7
complex of plants with higher labor-intensiveness				
Northwest	1,625	365	550	100.0
Central Chernozem	1,745	325	535	97.3
Western Siberia	1,940	340	573	104.2
complex of zone-specialized plants				
Central Chernozem	3,100	890	1,260	100.0
Donetsk-Dnepr'	3,015	880	1,240	98.4
Central Asian	3,340	915	1,320	104.8

As is evident from the data of Table 3, siting a complex of plants with high production metals-intensiveness specialized to produce output for unionwide consumption in the Western Siberian economic region requires comparatively low aggregate expenditures.

With consideration of transport expenditures on delivering finished products to consumption regions, the effectiveness of this siting variant increases. But siting a complex of plants with higher labor-intensiveness and limited consumption of output in Siberia and the Far East in Western Siberia leads, on the other hand, to a 4-10 percent increase in adjusted expenditures (depending on the region and the site).

When determining the basic directions of machinebuilding development and distribution by economic zone of the country, we need to take into account the socioeconomic prerequisites for developing particular branches of the national economy.

Calculations of the comparative economic effectiveness of developing and distributing machinebuilding by economic zone of the country and a comprehensive evaluation of the economic conditions of the regions enable us to make a number of generalizations.

The European portion of the country has great potential for machinebuilding growth: a strong scientific-technical and production potential, a large metallurgical base, a concentration of significant numbers of consumers, and so on. However, less-favorable factors include an extreme concentration of industrial production in a number of cities, high expenditures for fuel, electric power, water supply and environmental protection. Under such conditions, it is important to properly determine the direction of machinebuilding development and its territorial structure which are most effective for this particular zone. In the European USSR, this direction is to intensify specialization to produce particularly complex, high-precision machines and devices, the development of machine-tool manufacture, electrical engineering and automotive industry, and a number of other labor-intensive branches of machinebuilding which require highly skilled workers. Calculations show that, when enterprises of the indicated branches are located here, expenditures are less than were such enterprises to be built in the eastern regions. Thus, adjusted expenditures on turbine and turbine generator production are 20-25 percent lower in the European USSR than expenditures in the Western Siberian economic region; they are 16-19 percent lower in passenger car production and 13-27 percent lower in the production of a number of types of apparatus.

The comprehensive development of existing machinebuilding nodes and centers and ensuring an efficient combination of interbranch production facilities, intensifying parts and technological specialization and concentrating auxiliary production in them, are important directions in improving and increasing the effectiveness of territorial machinebuilding organization in this zone. It is appropriate to build highly specialized new plants primarily in medium-sized and small cities comprising agglomerated systems. As calculations show, siting large branch machinebuilding complexes in a majority of the economic regions of the European USSR is complicated by socioeconomic problems, intensifies the trend towards creating very large industrial centers, and increases the tautness of operation of individual railroad sectors.

The Central Asian republics and Kazakhstan also have opportunities for developing machinebuilding: the availability of energy and fuel here is good and there are free labor resources. In the future, machinebuilding will play an essential role in attracting the labor resources of southern Kazakhstan and Central Asia to material production. Branches in which the highest number of jobs per million rubles of capital investment are created will receive preferential development. Calculations show that siting production of a number of labor-intensive types of output is more

effective than the variant in which this output is produced and delivered from regions of the European portion of the country.

In Siberia and the Far East, the development of a number of machinebuilding branches is favored by the availability of fuel, electric power, water resources and metal, including high-quality metal. In order to form the Kansk-Achinsk fuel-energy complex, we need to build machinebuilding plants to produce highly productive equipment such as rotary excavators, rotary stripping complexes, belt conveyors and quarry transport. The Krasnoyarsk Heavy-Duty Excavators Plant will become the basis for developing a complex of mining equipment plants. A significant portion of the power-engineering equipment needed by Siberia will be supplied by existing boiler plants and a projected large plant specialized to produce central-heating power boilers. Accelerated construction of plants in the Minusinsk electrical engineering complex will play a large role in supplying power-engineering enterprises of the eastern regions with equipment.

The development of chemical, petrochemical and gas industry in Siberia and the Far East will lead to significant growth in the demand for corresponding types of technology and equipment. The most effective variant is to create a complex of chemical equipment and petroleum apparatus plants, which will permit a sharp reduction in transport expenses on delivering chemical and petroleum equipment to the eastern regions of the country.

An analysis of the effectiveness of siting enterprises of heavy, power, chemical, petroleum, construction and road machinebuilding and electrical-engineering industry enterprises in Western Siberia and the southern regions of Eastern Siberia which are oriented towards meeting the needs of the country's eastern zone shows that social expenditures are 10-12 percent lower under this variant than if equipment is delivered from the European USSR.

The calculations we made permit planning the basic directions of further improving the territorial proportions of the machinebuilding complex.

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